DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018-AB66

Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Lee County Cave Isopod (Lirceus usdagalun)

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final Rule.

SUMMARY: The U.S. Fish and Wildlife Service (Service) determines the Lee County isopod (*Lirceus usdagalun*) to be an endangered species pursuant to the Endangered Species Act of 1973, as amended (Act). Unlike most other members of its genus, the Lee County isopod has adapted to a totally subterranean aquatic existence. It is an eyeless, unpigmented isopod (a kind of crustacean) originally known from two cave systems in Lee County, Virginia. It has been extirpated from one of these systems, by pollution of the underground stream it inhabited. In its remaining cave system, the isopod is threatened by the proposed construction of a prison facility and an airport in the cave vicinity. These construction projects could degrade groundwater quality sufficiently to threaten the isopod's survival, unless construction plans provide for its protection. A proposed rule to list the isopod as endangered was published November 15, 1991.

EFFECTIVE DATE: December 21, 1992.

ADDRESSES: The complete file for this rule is available for public inspection, by appointment, during normal business hours at the Annapolis Field Office, U.S. Fish and Wildlife Service, 1825 Virginia Street, Annapolis, MD 21401.

FOR FURTHER INFORMATION CONTACT: Ms. Judy Jacobs at the above address, telephone (410) 269-5448, during normal business hours.

SUPPLEMENTARY INFORMATION:

Background

Among the rare creatures discovered by Dr. John Holsinger, during his extensive investigations of the caves in the central Appalachian region, was a freshwater isopod crustacean of the genus *Lirceus*. Unlike any of the other 13 species known to comprise the genus at that time, this species was troglobitic—that is, an obligate cave-dweller. In adapting to the lightless, unchanging cave environment, this species, over evolutionary time, lost its eyes and pigmentation. The species was named "usdagalun", the Cherokee word for "cave" or "hole under rock" (Holsinger and Bowman 1973).

Animals in the genus *Lirceus* occur in parts of the eastern and mid-western United States and the Great Lakes region of southern Ontario, Canada, in a variety of aquatic habitats, including springs, seeps, streams, ponds, sloughs, and drain outlets (Williams 1972). Some other species have been found in cave streams, but all species described prior to *L. usdagalun* have eyes and pigment, and none are considered obligate cave-dwellers (Hubricht and Makin 1949).

Subsequent to the discovery of *L. usdagalun*, an additional troglobitic species has been described (Estes and Holsinger 1976).

Lirceus usdagalun is an eyeless, unpigmented species measuring 4 to 7.5 millimeters (0.2–0.3 inches) in length. The body is about 64% longer than wide, and the head is about ⅓ as long as wide, with deep incisions on its lateral margins. The species was known historically from two cave systems, located approximately 10 kilometers (6 miles) apart, in Lee County, Virginia (Holsinger and Culver 1988).

The caves originally inhabited by *L. usdagalun* are developed in a band of low-dipping, middle-Ordovician limestone on the southern flank of the Cedar Syncline (Holsinger and Bowman 1973). This broad band of limestone, known locally as "the Cedars," is riddled with caves, sinks and ravines, typical for this water-soluble, limestone substrate, also known as karst. Such areas are particularly susceptible to contamination of groundwater from surface contaminants leaching through the porous substrate (Holsinger 1979).

Lirceus usdagalun has been extirpated by groundwater pollution from one of the two cave systems it originally occupied. This pollution resulted when large quantities of sawdust, by-product of a local sawmill operation, were piled on the ground surface over the cave. Rainwater leached tannins and other toxins from the sawdust and transferred these through the porous substrate into the underlying groundwater. Fortunately, the sizeable population of *L. usdagalun* in the other cave system was unaffected and is extant. Prior to its extirpation, a study comparing the populations in the two systems was conducted, and it was found that the two differed in numerous parameters (Estes and Holsinger 1982). The unique characteristics (and genotypes) exhibited by the extirpated population have been lost to the species forever.

The Lee County cave isopod was first recognized by the Federal government in the **Federal Register** Notice of Review published on May 22, 1984 (49 FR 21664). That notice, which covered invertebrate wildlife under consideration for endangered or threatened status, included *Lirceus usdagalun* as a Category 2 species. Category 2 includes those taxa for which proposing to list as endangered or threatened is possibly appropriate, but for which substantial data on biological vulnerability and threats are not currently available to support proposed rules. In the **Federal Register** Animal Notice of Review published on January 6, 1989, *L. usdagalun* was retained as a Category 2 species, since available information indicated that its status was essentially unchanged from 1984; it was rare, but there were no known threats to its survival. Since that time, numerous threats to the species' continued existence have appeared, as described below. One of these, the above-mentioned sawdust stockpiling, has already resulted in the extirpation of the species from half its originally known range. Accordingly, on November 15, 1991, the Service published in the **Federal Register** a proposal to list *Lirceus usdagalun* as an endangered species (56 FR 58026). With the publication of this final rule, the Service now determines endangered status for this isopod.

SUMMARY OF COMMENTS AND RECOMMENDATIONS

In the November 15, 1991, proposed rule and associated notifications, all interested parties were requested to submit factual reports or information that might contribute to the development of a final rule. The comment period originally closed on January 14, 1992. Comments were requested from appropriate state agencies, county governments, scientific organizations, and other interested parties. Newspaper notices inviting public comment were published on December 3, 1991, in the Kingsport (Tennessee) Times and on December 4, 1991, in the Powell Valley (Virginia) News. On December 20, the Service received a request for a public hearing from Lee Norton Scott Wise Planning District Commission (LENOWISCO). Accordingly, on January 17, 1992, the Service published in the **Federal Register** a notice extending the comment period to February 21, 1992, and announcing a public meeting and hearing to be held in Jonesville, Virginia on February 6, 1992. The meeting allowed for the open exchange of information between the Service and local citizens, in a question and answer format, prior to the formal hearing procedures.

A total of 14 comments were made during the public hearing. Commenters included 5 Lee County officials; the Executive Director of LENOWISCO; consultants for both the prison and the airport; representatives of the Sierra Club and the Virginia Cave Board; and 4 local residents. The point that was made repeatedly by the County and LENOWISCO officials was that Lee is one of the most economically depressed counties in the State of Virginia, and that the Federal prison and the airport are desperately needed to bolster the County's economic well-being. The commenters noted, as the Service had indicated earlier, that economic factors are not included in the Service's determinations of endangered or threatened status; however they wished to point out these economic factors for the record, and their view of the listing of the isopod as "an unnecessary obstacle in the path of the economic future" of Lee County. The consultants for the prison and the airport described the economic and physiographic constraints under which they were working in proposing alternative sites for these facilities. The Service recognizes the validity of these concerns and is working closely with county officials and planning authorities to devise location and design alternatives for the airport and the prison that are compatible with the continued existence of the isopod. However, as noted above, the decision whether to add the isopod to the Federal list is to be based solely on an evaluation of biological factors.

The prison and airport consultants also questioned the completeness of the Service's data indicating only one remaining location for the isopod. The Service responded that data on the distribution of this isopod are based on some 30 years of extensive searching of caves in Virginia, Kentucky, and Tennessee by Dr. John Holsinger and colleagues (Holsinger, pers. comm. 1992). Since the discovery of *L. usdagalun* in 1971, these speleobiologists have conducted intensive searches of caves in Lee and surrounding counties with the specific goal of finding any additional populations of this species. Although these searches have revealed no additional populations of *L. usdagalun*, other isopod species of the genus *Lirceus* have been located in some other caves in the area. In general, members of the genus *Lirceus* tend to be of very localized distribution, endemic to small areas. When the ecological "niche" that *Lirceus usdagalun* would occupy in a cave ecosystem is filled by another species, there is virtually no chance of expecting to find *L. usdagalun* in that cave. In summary, data now in possession of the Service indicate very strongly that the chances of finding additional populations of this isopod at any considerable distance from the known population are extremely low.

The representative of the Sierra Club took no position on this proposed listing but registered the general concern that any development should be environmentally sound as well as economically self-sustaining. The representative of the State of Virginia Cave Board indicated that the State's

Cave Protection Act bans the willful destruction of any cave biota. It was his belief that this restriction should apply to counties or companies as well as to individuals.

The residents of Lee County spoke in support of the listing of the isopod, both noting the close relationship between the isopod's well-being and the purity of the groundwater upon which Lee County residents depend for drinking. Two other residents stated their opposition to the listing if this action interfered with the construction of the prison or the airport.

A total of 14 written comments on this proposed listing were received, from: The Commonwealth of Virginia (Department of Game and Inland Fisheries and Department of Conservation and Recreation); four biology professors; one hydrologist; and seven local residents. Both letters from the Commonwealth of Virginia expressed full support for the proposed listing. Similarly, all of the biologists wrote in support of the listing, reiterating the rarity of the isopod and the severity of the threats it faces.

The hydrologist indicated his belief that the proposal "significantly overstated" the damage of the "sawdust disposal incident" to the isopod. However, no information was presented in support of this belief. The letter further indicated his belief that "a very strong case can be made that the isopod exists in most of the area of the Cedars and adjoining areas". Again, no supporting documentation was presented. This latter point was addressed above. In response to the first point, all information from biologists and cavers who have visited the site of the sawdust disposal (including observations by a Service biologist) indicate severe degradation of groundwater quality from tannins and other products of wood decomposition. The stream that had been occupied by the isopod was lined with a black sludge, had an unpleasant odor and an obviously high B.O.D. (biological oxygen demand). In short, the stream within the cave was clearly uninhabitable by any aquatic organism requiring relatively unpolluted conditions. At present, much of the sawdust at the cave mouth has been removed, and the water is clearing, perhaps sufficiently to be re-occupiable by the isopod at some future date.

Of the seven comments received from local residents, six supported the listing of the isopod, expressing the belief that it deserved a chance to live in its natural habitat; that it is beneficial to preserve what little is left of our natural resources; and that every creature and plant has a unique purpose for being. One comment, from an owner of one of the entrances of the cave system still occupied by the isopod, expressed her extreme displeasure at the Federal government becoming involved in this "local" issue, and her opposition to any action that would interfere with the struggling economy of Lee County. As stated above and at the public meeting, the Endangered Species Act requires that listing decisions be based solely on biological evidence. However, the Service does not believe that recognition of the endangered status of this species and its subsequent protection are incompatible with reasoned development in Lee County.

Summary of Factors Affecting the Species

Section 4(a)(1) of the Endangered Species Act (16 U.S.C. 1531 *et seq.*), and regulations (50 CFR part 424) promulgated to implement the listing provisions of the Act, set forth the procedures for adding species to the Federal lists. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1). These factors and their application to the Lee County cave isopod (*Lirceus usdagalun*) are as follows:

A. The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range

Lirceus usdagalun has been extirpated from half of its originally known range by the degradation of its aquatic habitat at one of the two cave systems it was known to occupy. Leachate from sawdust that had been piled on the ground surface above the cave entered the cave's stream system, stripping oxygen from the water and severely contaminating both the water column and the stream bed. In May of 1990, the cave was intensively surveyed, but no *Lirceus* or other aquatic cave organisms were found. The stream system within the cave is presently too polluted to support any of its original aquatic fauna (J.R. Holsinger, Old Dominion University, pers. comm., 1991).

At present, there are two major development projects, an airport and a prison facility, proposed to be constructed in the vicinity of the isopod's remaining cave system that could easily destroy the fragile habitat on which the isopod depends. Some alternatives under consideration would locate these facilities over or adjacent to large sinkholes. Such a location would facilitate sediments or pollutants entering the groundwater during construction or operation phases, thus potentially eliminating the isopod. These developments must be planned based upon an in-depth knowledge of karst topography and groundwater connections, to protect the isopod as well as to ensure the structural integrity of the proposed developments.

B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Lirceus usdagalun is of no perceived value to hobbyist collectors. The only interest in collection of the species would be for purely scientific purposes, and these would be coordinated with State and Federal authorities.

C. Disease or Predation

This isopod is undoubtedly a food item in the diet of certain natural predators, including cave salamanders and possibly crayfish (Holsinger pers. comm., 1991). However, this naturally occurring predation is not currently considered a threat to the isopod's continued existence. There are no known diseases affecting the species.

D. The Inadequacy of Existing Regulatory Mechanisms

Although there are no Federal or State laws specifically protecting the isopod or its habitat, certain laws do address groundwater pollution, in part. The Solid Waste Disposal Act of 1976, as amended, (Pub. L. 98-616), also referred to as the Resource Conservation and Recovery Act, regulates underground storage tanks and solid waste disposal, in conjunction with the states. This law also includes the Safe Drinking Water Act as an amendment in 1986 (Pub. L. 99-339), which deals with wellhead protection of public drinking water sources.

At the State level, several laws have some relevance to protection of the isopod and its habitat. The Commonwealth of Virginia's Cave Protection Act (Virginia Code, Title 10, Chapter 12.2 § 10-150.11-10.150.18) states that it is "unlawful to remove, kill or otherwise disturb any naturally occurring organisms found in any cave." However, this law does not ensure the high quality of groundwater inflow to caves. The Virginia Water Control Law (Title 62.1, Chapter 2) prohibits the discharge of any pollutant into State water (including groundwater) without a permit. This law deals very specifically with point sources but does not address non-point sources as directly. Enforcement of this law is typically remedial where specific permits are not required. Virginia's Solid Waste Management Regulations (VR 672-20-

10) prohibit open dumping (for example, into sinkholes) and require permits for any disposal of solid waste. However, staff for enforcing these regulations is limited. Section 32.1–164 of Virginia's Public Health Laws provides for the specification of minimum distances between sewerage systems or sewage treatment works and groundwaters. Virginia has also formed a groundwater protection steering committee, which consists of 12 State agencies that administer programs with potential impacts to groundwater resources. However, despite the existence of these laws and committees, there is presently no specific program focused on protection of the isopod or prevention of groundwater pollution (from all sources) in the area it inhabits. Furthermore, these laws were insufficient to prevent the pollution of groundwater in the cave from which the isopod is now extirpated.

E. Other Natural or Manmade Factors Affecting Its Continued Existence

Although not presently a problem, *L. usdagalun* could be adversely affected by an increase in human foot traffic through the cave in which it occurs. The isopods could be affected directly, or indirectly, by increased siltation of the stream they occupy.

The Service has carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by this species in determining to make this rule final. Based on this evaluation, the preferred action is to list *Lirceus usdagalun* as endangered. The species has been extirpated from one of the two cave systems it was known to occupy, and it faces threats that could extirpate it from its remaining cave system. In the view of the Service, the isopod is in imminent danger of extinction throughout the remainder of its known range. To list this species as threatened would not accurately reflect the immediacy of the threats it faces. Clearly, endangered status is the most appropriate designation for *Lirceus usdagalun*.

Critical Habitat

Section 4(a)(3) of the Act as amended, requires that, to the maximum extent prudent and determinable, critical habitat be designated concurrently with the determination that a species is endangered or threatened. The Service finds that designation of critical habitat is neither prudent not beneficial for *Lirceus usdagalun*.

As noted under Factor E above, the isopod and its habitat could be adversely affected by an increase in foot traffic through the stream it inhabits. Presently, the location of the cave system is not widely known. Publication of a precise map and locality description could increase the incidence of unauthorized visitation to the cave system, with possible adverse consequences for the isopod and its habitat. Such unauthorized intrusion would be extremely difficult to regulate, due to the remote location of the cave system and to the existence of multiple entrances. For this reason, the Service concludes that it is not prudent to designate critical habitat for *Lirceus usdagalun*.

In addition to the possible adverse consequences of designating critical habitat, the Service believes that in this case, the isopod would receive no additional protection from the designation of critical habitat. Because the isopod is now known from only a single cave system, any adverse modification of this system would be likely to jeopardize the continued existence of the species. All involved parties and principal landowners have been notified of the isopod's location and importance of protecting its habitat. The Service believes that habitat protection for this species will be best accomplished through the Section 7 jeopardy standard and the Section 9 prohibitions against take. In summary, it would be of no benefit, and it is not considered prudent, to determine critical habitat for this species.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Endangered Species Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing encourages and results in conservation actions by Federal, State, and private agencies, groups, and individuals. The Endangered Species Act provides for possible land acquisition and cooperation with the States and requires that recovery actions be carried out for all listed species. The protection required of Federal agencies and the prohibitions against taking and harm are discussed, in part, below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of any endangered or threatened species or to destroy or adversely modify any designated critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with the Service. The prison and the airport proposed to be constructed in the vicinity of the isopod's habitat are under the jurisdiction of the Federal Bureau of Prisons and the Federal Aviation Administration, respectively. These agencies are presently working with the Service to incorporate the needs of the isopod, including groundwater protection measures, into their project plans.

The listing of this isopod also brings Sections 5 and 6 of the Endangered Species Act into full effect on its behalf. Section 5 authorizes the acquisition of lands for the purpose of conserving endangered and threatened species. Pursuant to Section 6, the Service may grant funds to affected states for management actions aiding the protection and recovery of the species.

The Act and its implementing regulations found at 50 CFR 17.21 set forth a series of general prohibitions and exceptions that apply to all endangered wildlife. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to take (includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect; or to attempt any of these), import or export, transport in interstate or foreign commerce in the course of a commercial activity, sell or offer for sale in interstate or foreign commerce, any listed species. It is also illegal to possess, sell, deliver, carry, transport or ship any such wildlife that has been taken illegally. Certain exceptions apply to agents of the Service and State conservation agencies.

Permits may be issued to carry out otherwise prohibited activities involving endangered wildlife species under certain circumstances, namely, for scientific purposes, to enhance the propagation or survival of the species, and/or for incidental take in connection with otherwise lawful activities. Regulations governing permits are at 50 CFR 17.22 and 17.23.

National Environmental Policy Act

The Fish and Wildlife Service has determined that an Environmental Assessment, as defined under the authority of the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the

Endangered Species Act of 1973, as amended. A notice outlining the Service's reasons for this determination was published in the **Federal Register** on October 25, 1983 (48 FR 49244).

References Cited

Culver, D.C. 1976. The evolution of aquatic cave communities. Amer. Nat. 110(976): 945–957.

Estes, J.A. and J.R. Holsinger. 1976. A second troglobitic species of the genus *Lirceus* (Isopoda, Asellidae) from southwestern Virginia. Proc. Biol. Soc. Wash. 89(42): 481–490.

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Holsinger, J. R. 1979. Freshwater and terrestrial isopod crustaceans. IN: D.W. Linzey, ed. Proceedings of a Symposium on Endangered and Threatened Plants and Animals of Virginia. Blacksburg, Virginia: Virginia Polytechnic Institute and State University. pp. 130–148.

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Holsinger, J.R., and D.C. Culver. 1988. The invertebrate fauna of Virginia and a part of eastern Tennessee: Zoogeography and ecology. Brimleyana 14: 1–162.

Hubricht, L. and J.G. Makin. 1949. The freshwater isopods of the genus *Lirceus* (Asellota, Asellidae). Amer. Midl. Nat. 42(2): 334–349.

Williams, W.D. 1972. Freshwater isopods (Asellidae) of North America. Biota of Freshwater Ecosystems Ident. Manual No. 7, U.S. Environmental Protection Agency, 45 pp.

Author

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List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Regulation Promulgation

PART 17—[AMENDED]

Accordingly, part 17, subchapter B of chapter 1, title 50 of the Code of Federal Regulations, is amended as set forth below:

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Public Law 99–625; 100 Stat. 3500; unless otherwise noted.

2. Amend § 17.1 by adding the following, in alphabetical order under "CRUSTACEANS," to the List of Endangered and Threatened Wildlife:

§ 17.11 Endangered and threatened wildlife

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Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
Crustaceans:							
*	*	*	*	*	*		
Lee County cave isopod	*Lirceus usdagalun*	U.S.C. (VA)	N/A	E	483	NA	NA
*	*	*	*	*	*		

Dated: October 1, 1992.

Bruce Blanchard,

Acting Director, Fish and Wildlife Service.

[FR Doc. 92–28040 Filed 11–19–92; 8:45 am]

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